

THE GEOGRAPHY OF LUMBERING IN
THE MISSISSIPPI RIVER SECTION
OF EASTERN IOWA

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LYDA C. BELTHUIS

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE UNIVERSITY OF MICHIGAN JUNE 1947

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THE LUMBER INDUSTRY IN EASTERN IOWA

Before the Black Hawk Purchase Treaty was signed in 1832 the area now included in the State of Iowa was Indian land, except for a small triangle in the southeastern corner known as the "Half-Breed Tract". During the centuries of Indian occupancy the forests had been little used. In an economy based on hunting, with gardening as a minor activity, the Indians used the timber which grew along the streams only for building their small, temporary dwellings and for fuel to heat their homes and cook their simple food. They had also learned to tap the maple trees to secure sugar. There was no wholesale cutting of timber. Occasional prairie fires destroyed the small trees, but there was, on the whole, not much destruction of timber.

The white settlers, in contrast to the Indians, had an economy which required the extensive use of wood and wood products. For over two hundred years pioneers had been developing homes in the eastern forests. The axe, log cabin, and rail fence were symbols of the pioneer. When the settlers reached the open prairies they were confronted with a different set of conditions. Only by crossing many miles of treeless plains and mountains to the wooded areas of the Pacific Coast could these forest dwellers again have the environment to which they had been accustomed.¹

Iowaland was a country of prairies, with wooded areas along the streams, and the settlers who came from forested regions doubted the fertility of the prairies, for in the East

¹ Walter P. Webb's *The Great Plains*, p. 149, quoted in Glenn T. Trewartha's "Climate and Settlement of the Subhumid Lands" in the *Yearbook of Agriculture* (U. S. Department of Agriculture), 1941, p. 172; James Hall's *Notes on the Western States*, p. 158, also cited in the *Yearbook of Agriculture*, 1941, p. 173.

land without trees was usually undesirable. In Kentucky, for example, large unforested areas were known as "barrens". And so the early pioneers chose timberlands for their first homes. Here they found shelter from the storms, logs for their cabins, rails for fences, and fuel for their fireplaces.² Here they felt more at home, more protected, than on the open prairies. In the words of one pioneer, the forest dwellers "would snuggle up to them". Another early resident of the Iowa area described the settlements beyond the timber in this way:

Skirting the timber land . . . might be seen a continuous series of incipient farms, each adorned with a settler's cabin. Occasionally some one more adventurous than the rest had launched boldly out from the shore . . . into the open ocean prairie, and had fixed his home where the storms of summer and the wintry winds might approach him on all sides, and in defiance, also, of the distance whence the materials for fire and shelter and fences were to be procured.³

Settlers soon found that the unforested, gently-sloping hillsides and the level prairies were as fertile as the timbered areas and could be transformed into farms much more easily. The prairie sod was tough, but it could be turned over with a breaking plow drawn by oxen. There was no such easy way to dispose of the timber. Soon the prairies were dotted with claims.

By 1840, the fringe of population in the southeast quarter of Iowa was thickest along the Des Moines River where it reached a width of three regulation counties back from the Mississippi. The Skunk and Maquoketa rivers, though small, drained fertile and attractive districts. Between

² Floyd B. Haworth's *The Economic Development of the Woodworking Industry in Iowa* (*Iowa Studies in Business*, No. 13, Bureau of Business Research, State University of Iowa), p. 12.

³ Charles Mason, Iowa's first Chief Justice, gave this description in 1858, referring to conditions in Iowa in 1837.—Irving B. Richman's *Ioway to Iowa*, pp. 177, 178.

these — and within the same area of habitation — were the Iowa and its larger affluent, the Red Cedar. North of 42° latitude, the streams were smaller and the fringes of occupation along the Wapsipinicon, the Turkey, and the Iowa were a single county wide, even though beyond this wooded strip were large bodies of the now desirable, but then despised prairie.

This stream-following settlement pattern continued until about 1850. The fringe of settlement gradually widened; population became more dense and extended westward, with long fingerlike projections up the streams which found their outlet in the Missouri River. This pattern was extended until all sections had some population. As areas became settled, counties were formed, and governments established. By 1860, this process had been largely completed.⁴

All these early settlers needed wood products of various kinds but they found that these were not available to them except in the crude forms they could fashion with the tools they brought with them. The first task of the pioneer after staking his claim was to provide some form of shelter. The three-faced camps were perhaps the most primitive of the dwellings made of timber. These were formed of three walls made of rough logs with small straight poles placed over the walls as rafters. Over these, hand-hewn clapboards were laid to make a roof. This type of shelter was used only for rest camps or until a more permanent type of cabin could be constructed and was seldom used in Iowa.

The cabin proper required much work and usually additional help. Logs were cut into the desired dimensions of the cabin and dragged to the site selected for the cabin usually with the aid of horses, or oxen. Plans for a cabin called for a single room, perhaps twelve by twelve, or sixteen by eighteen feet. Rarely it was as large as eighteen by

⁴ George F. Parker's *Iowa Pioneer Foundations*, Vol. I, pp. 117, 118.

twenty feet. Notches were cut in the logs to make them fit together. When the cabin walls reached seven or eight feet, two gables were forced by shortening the logs on the ends of the building. A roof was built on the gables by laying very straight small logs or stout poles from gable to gable at regular intervals. On these, clapboards, much like the modern shingles but larger and thicker, were fastened. Weight poles were laid over the clapboards and secured by long wooden pegs driven into auger holes. These kept the clapboards from sliding to the lower edge of the roof. The cracks between the logs were filled with mud and then daubed over on both sides with plaster. Floors might be of dirt but more often were of the puncheon type, made of logs split in half with the flat side up.⁵

Some families brought furniture with them, but this, owing to the distance usually traveled, was not common. The furniture of most cabins varied with the ingenuity of the occupants. Tables, benches, and stools were made of split logs with peg legs. Beds were made of a log frame which was fastened in the wall of the cabin.

After the pioneer had "raised" his log cabin, he continued to labor in the strips of timber, making rails to fence his cultivated plots to keep out the deer or the domestic animals that ran at large. A good pioneer fence was one that was "hog tight, horse high, and bull strong". Thousands of rail fences were built in Iowa. When these became weathered and were covered with vines, they made picturesque features of the landscape as they zigzagged up hill and down. Barbed wire to replace them did not appear until 1858. One author, in speaking of the needs of the settlers on the prairies, said that "Barbed wire and windmills made the settlement of the West possible".⁶

⁵ Richman's *Ioway to Iowa*, p. 178; Mildred J. Sharp's "Early Cabins in Iowa" in *The Palimpsest*, Vol. II, pp. 16-29.

⁶ Cyrenus Cole's *Iowa Through the Years*, pp. 217, 218, 357; Webb's *The*

The construction equipment of early settlers who came to Iowa included the axe, broadaxe, froe or frow, auger, and plane. Cutting boards with such tools required much hard work. The settlers early started the making of planks by "whipsawing". In preparation for this work a platform was erected on a hillside and a pit dug beneath it. A log was then rolled onto the wooden frame and one man stood on the platform, the other in the pit. The two pulled a cross-cut saw which ripped planks off the log. This cut better boards but it, too, was a slow process.⁷

These wood-using people brought to this land knowledge of several trades. There were coopers and cabinet-makers, who sought wood for the products they could construct for the needs of the local people as well as for the outside market. The cabinet-maker did high quality hand work, making cupboards, bedsteads, and other furniture. The cooper, while a skilled woodworker, usually found little demand for barrels in the early pioneer settlements so he often became a farmer. There were some who worked on the farms in summer and in the woods in winter, where they cut logs for fuel, repair materials, and fencing. Some also took logs to mills where they had them made into lumber which they then sold for cash.⁸

In the early days of farming in the Iowa area, agricultural tools were few and crude. The early plows had wooden mold-boards which needed to be scoured constantly to be of use. The steel plow, first developed near Dixon, Illinois, from a discarded circular saw blade, came like a "gift from

Great Plains, p. 280, quoted in Trewartha's "Climate and Settlement of Sub-humid Lands" in the *Yearbook of Agriculture* (U. S. Department of Agriculture), 1941, p. 175.

⁷ George C. Duffield's "Frontier Mills" in *The Annals of Iowa* (Third Series), Vol. VI, pp. 427, 428. The broadaxe was used in hewing the logs after they were cut. A froe or frow was a cutting tool with a handle at right angles. It was used in slicing shingles from sections of a log.

⁸ Parker's *Iowa Pioneer Foundations*, Vol. I, pp. 228, 229.

God". It made John Deere's name a household word and also made him rich. Mowing and reaping machines were invented the year the Black Hawk Purchase was opened (1833) but they did not come into general use in Iowa until after the Civil War because people could not afford them. Scythes and cradles in the meantime remained the principal harvesting tools.⁹

Although the early settler found his temporary housing, his crude tools, and his facilities of travel not much to his liking, he felt that he had found a desirable home and settlement developed rapidly. In June, 1832, there were probably not more than fifty white people living within the limits of the future State of Iowa. The first census of the Iowa District, in August, 1836, showed the population to be 10,531. In 1838, it had increased to 23,242.¹⁰ This influx of people from the eastern and southern parts of the country as well as from Canada and England brought a great demand for lumber products. There was the desire, especially on the part of the women folks, for a bit of elegance beyond the first immediate need of shelter, or at least for some of the comforts, and conveniences of their former homes. These desires helped to bring about the establishment of mills and woodworking plants which were soon to become important parts of the Iowa economy.

This study of the lumbering and associated industries in Iowa is an attempt to describe and explain the changes, both through time and in location, which have characterized these enterprises since their beginnings up to the present. These changes, operating together, produced variations within the industry in character, location, and magnitude.

⁹ Cole's *Iowa Through the Years*, p. 218.

¹⁰ F. I. Herriott's "Whence Came the Pioneers of Iowa?" in *The Annals of Iowa* (Third Series), Vol. VII, pp. 454, 456, 460, 464; *Iowa Historical and Comparative Census, 1836-1880*, p. 168; Marie Haefner's "The Census of 1838" in *The Palimpsest*, Vol. XIX, p. 185.

Although the changes were and still are going on continuously, it has been convenient to recognize three general periods, each of which had certain qualities of nature and distribution.

The first of these which may be called the pioneer period started in 1833 and continued until 1860. Characteristic of this interval of time were many small mills scattered along the streams of the State. These cut local timber which was manufactured near the sawmills for the purpose of supplying the local demand for wood products. In addition to this pattern, there was, especially in the latter part of the period, a concentration of larger mills in several Mississippi River towns which used logs received by rafting.

The middle period, 1860-1910, was marked by large units of industry in eastern Iowa towns and a peak lumber production for the State. This industry was based almost entirely upon the rafting of logs from the northern pineries. After 1889, there was a gradual decrease in the amount of logs available which resulted in the end of rafting and the closing of the sawmills operating on rafted supplies shortly after the end of the first decade of the twentieth century.

In the third or present period, some wood-using industries, started in the middle period, continued to operate in the river towns; others were developed in the larger cities of the State on lumber delivered by rail. In some of the smaller towns there have been wood manufacturing shops since the pioneer and middle periods. These remained as producing units in the third period and some others were added. Many small portable mills cutting local timber were started early in the present period. Some of these remain.

PIONEER PERIOD OF LUMBERING

The early people who came to Iowa knew that trees grew primarily along streams, but they did not know how large a

portion of the area then had such cover. A Federal government publication is authority for the statement that when the white man came to the area one-fifth of it was forested. In a recent State publication the amount of the original timberland is given as 5,000,000 acres or about one-seventh of the State's area. One early writer (1857) said that "according to the most reliable estimates, *at least one-tenth part of the State of Iowa is timber land*".¹¹

From data obtained by the U. S. Land Office surveys of 1832-1859, one Iowa writer concluded that the "most accurate estimate appears to be one offered in a memorandum found in the files of the Iowa Forest and Wasteland Survey which places the original forested area of the State at a figure of 6,680,926 acres, or 18.77 per cent of the land area. This estimate was determined by planimentering a map of Iowa based on the original land survey."¹²

Just which of these estimates is most nearly correct can never be determined. They do indicate, however, that the amount of timber in Iowa was large enough to serve the needs of the early settlers. The uneven distribution of the forest was, however, the real problem. In some places the prairies were from twenty to forty miles wide, and timber was inconveniently distant for those who settled in such areas.¹³

The original woodlands were most abundant in the eastern and southeastern sections, and thinnest in the north central and northwestern districts. In several northwestern tracts there were no woods whatsoever except a narrow

¹¹ Hugh P. Baker's *Native and Planted Timber of Iowa* (Forest Service Circular, No. 154, U. S. Department of Agriculture), p. 8; Jacob L. Crane, Jr., and George W. Olcott's *Report on the Iowa Twenty-five Year Conservation Plan*, p. 72; Nathan Howe Parker's *The Iowa Handbook, for 1857*, p. 27.

¹² George B. Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 52, 53.

¹³ Nathan Howe Parker's *Iowa as It Is in 1857*, p. 36.

fringe around lakes and in river valleys. In those areas of Iowa having forests, the northern and eastern slopes were most commonly wooded, while the southern and western ones were comparatively treeless. Hot and dry south and southwest winds seem to have checked the growth of trees on these two exposures. In flatter areas, these winds and prairie fires may have been responsible in part for the general lack of trees.

The forests that were present when white men came into Iowa contained much the same species as occur among those that remain. The location of the various species was, then as now, determined by elevation, latitude, and such factors as moisture, soil, slope, and drainage. Along river bottoms, where the growth of timber was most abundant, the commonest trees were walnut, elm, cottonwood, river birch, hackberry, willow, swamp oak, ash, linden, locust, sycamore, and soft maple. The upland timber consisted mainly of many varieties of oak, hickory, hard maple, elm, wild fruit trees, juniper, and butternut. Upland and lowland trees intermingled to some extent. There were also some less common varieties. In the northeastern counties, for example, there were scattered stands of native white pine, low-growing yew, and juniper.¹⁴ On the whole, however, Iowa timber consisted largely of broadleaf trees.

Early travelers in Iowa have given clear but probably somewhat exaggerated statements about the timber of their day. One writer, in 1857, spoke of the valley of the Des Moines River as having abundant supplies of walnut and other valuable timber. Hickory and walnut trees, he stated, occurred in great numbers along the nearby Iowa, Skunk, and Cedar rivers. Of the timber along the Mississippi he wrote as follows: "I have seen on the banks of the Mississippi as fine a growth of oak as could be desired; trees three

¹⁴ Crane and Olcott's *Report on the Iowa Twenty-five Year Conservation Plan*, p. 72.

and four feet in diameter, standing in a body, miles in length, and three miles in width."¹⁵

Despite glowing statements of people who saw the forests before much cutting had occurred, a considerable portion of the original timber of Iowa is known to have been inferior in quality. The amount of Iowa timber of the size and type found in the northern lake States was comparatively small. This was especially true of many of the stands away from streams which were suitable only for a poor grade of posts and fuel. The local hardwood timbers were furthermore difficult to cut and to use in building. The softer pine woods from the northern States were therefore welcomed by Iowa farmers and carpenters.¹⁶

The first sawmills in Iowa were small, crude, and inefficient. Several sawmills were started in the first few years of settlement. There were no regulations regarding the building of dams, the construction of mills, or the installation of machinery at that time. In January, 1839, several people were given permission to proceed with such developments on the Skunk, Des Moines, and other rivers provided they did not interfere with the right of any individual. If dams were built across navigable streams, a lock at least 130 feet long and 35 feet wide must be installed. Since stream navigation was not of major importance, the necessity of complying with laws regarding the building of locks was not of frequent occurrence or of much concern to the miller. His greatest problem was to find a mill site where the stream flow was adequate to assure sufficient power for year round operation of his grist mill or sawmill.¹⁷

¹⁵ Parker's *The Iowa Handbook, for 1857*, p. 27.

¹⁶ Baker's *Native and Planted Timber of Iowa*, p. 9. "Hardwood", as used in lumbering, includes timber from broad-leaved trees; softwood refers to lumber from coniferous trees.

¹⁷ Jacob A. Swisher's *Iowa Land of Many Mills*, pp. 42, 45, 46; *Laws of the Territory of Iowa, 1838-1839*, pp. 337-343.

The early mills of Iowa were primarily those using water power. There were a few steam mills in operation very early in the history of the Territory such as the one erected at Dubuque in 1837. The large mills which were soon to appear along the river were in the main steam-powered, as were the smaller ones of western and northwestern Iowa, but the dominant type in other sections was the water mill.¹⁸

Sawmills¹⁹ were a pioneer necessity as were mills for grinding grain. Since both were needed in every community, many started as combination saw and grist mills. After the local timber was cut, most of those which had their beginning as sawmills, fell into decay or were converted into grist mills. A large number of mills within the State continued to operate dually for many years. As the available timber became less, more and more emphasis was placed on grain grinding. To these early mills farmers brought logs which were sawed for a toll.

The first sawmill in what is now Iowa was built on the Yellow River some four years before white settlement was permitted. It was constructed to cut local timber and that brought from the Menominee River of Wisconsin for the construction of the second Fort Crawford located near Prairie du Chien. Since some of the lumber used for the fort was cut in 1831 when Jefferson Davis was in command the structure became known as the "Jeff Davis" mill.²⁰

¹⁸ For a description of early Iowa mills and mill dams see Swisher's *Iowa Land of Many Mills*, pp. 41-76; Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 59, 60.

¹⁹ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 60, 61; Duffield's "Frontier Mills" in *The Annals of Iowa* (Third Series), Vol. VI, p. 430; Swisher's *Iowa Land of Many Mills*, pp. 72, 73; George W. Hotchkiss's *History of the Lumber and Forest Industry of the Northwest*, pp. 650-656.

²⁰ Jacob A. Swisher's "The Old Rustic Mill" in *The Palimpsest*, Vol. XVII, pp. 298, 299; Ellison Orr's *Hunting an Old Dam Site* (published by the author, 1930); M. M. Quaife's "The Northwestern Career of Jefferson Davis" in the *Journal of the Illinois State Historical Society*, Vol. XVI, p. 13.

Other mills were soon built. The five mentioned below were probably the earliest ones, or at least among the earliest. J. B. Quigley, R. H. Hetfield, D. Beasley, and Wm. Grant located at Millville, Clayton County, on the Turkey River in 1833 and soon erected a log cabin and sawmill. In Dubuque County, C. Sage and B. Bushee that same year or the next erected a sawmill at a point on the Little Maquoketa River, called Sageville, just north of Dubuque. Since this structure, like many other early mills, was crude and temporary in nature, it was replaced as early as 1852 by a stone mill. This building, although no longer in use as a mill, remains as a landmark today.²¹

In Scott County, the first sawmill was the one built by Captain Benjamin Clark on Duck Creek about three miles south of Davenport, possibly as early as 1834, but not later than 1836. This was a small upright mill and one which served settlers for many years. In Des Moines County, Levi Moffatt built a saw and grist mill along the Skunk River in 1834 or 1835. This, too, was a primitive affair which barely served the purpose. By 1840, several others had been constructed.²²

The method of obtaining timber for the newly established mills varied with the location and time. Away from the rivers, the logs to be made into lumber were cut by the persons who owned the land on which they grew, and dragged to the mill by the use of horses or oxen. In the settlements along the Mississippi, the mills did a much larger business and after using the available material nearby, men turned to rafting logs from the pine forests of Wisconsin and Minnesota. Most of the early rafts seem to have been of lumber, but later much log rafting was carried on.

²¹ Realto E. Price's *History of Clayton County Iowa*, Vol. I, p. 48.

²² A. T. Andreas's *Illustrated Historical Atlas of the State of Iowa*, p. 344; *History of Des Moines County, Iowa* (1879), p. 376; Swisher's *Iowa Land of Many Mills*, pp. 254, 268.

No one knows just when the first raft appeared on the river. In the early 1830's lumber rafts from the Chippewa pineries were floated down the Mississippi to be marketed at towns along its banks. In 1833, a small raft of pine, probably the first that was sold in Iowa, furnished the material for a frame building used as a boarding house in Dubuque.²³ Other rafts of logs and lumber reached Iowa regularly in the late 1830's. On July 3, 1838, a raft containing 100,000 feet of pine plank arrived at Fort Madison from the Chippewa country.²⁴ One Iowa writer colorfully portrayed the coming of the rafts in the days of early settlement.

Before many pioneers had ventured far beyond the high bluffs bordering the Mississippi, before the wagon trains of the Mormons had left the imprint of their wheels upon the grass-grown prairies as they wended westward, while bee hunters and fur traders in frail canoes were yet pushing up the smaller streams, and while the Indian still claimed Iowa as his rightful home, the first log rafts — harbingers of a great industry — came floating down the Mississippi. Although the lumber for the first frame houses in the river towns of Iowa may have been imported from Ohio or Indiana sawmills, it is a fact that “in 1839 the pineries of Wisconsin were beginning to send their products southward by rafts.”²⁵

Newspapers of the period carried many stories about rafting. *The Davenport Sun* of May 3, 1839, reported that “several large rafts of pine lumber have already arrived at this place and Stephenson, from the pine regions of Wisconsin.” The Dubuque *Iowa News* of June 23, 1840, stated that “A large raft of sawed pine lumber arrived here from Plover portage on June 16, and fifteen more rafts from the same place are on the way down. If the water in the Chippewa and Wisconsin continue high a little longer the towns

²³ *The History of Dubuque County, Iowa* (1880), p. 353.

²⁴ William J. Petersen's *Iowa The Rivers of Her Valleys*, p. 41.

²⁵ Marie E. Meyer's “Rafting on the Mississippi” in *The Palimpsest*, Vol. VIII, pp. 121, 122.

of the upper Mississippi will be literally deluged with pine lumber.''²⁶

While rafts of lumber were coming from the forests of Minnesota and Wisconsin by 1840, in parts of the Mississippi Valley some lumber was still being received from the East. This, too, is suggested in the statements of newspapers of the period. According to the *Missouri Argus*, "The valley of the Mississippi is [yet] supplied with pine lumber from New York and Pennsylvania''. Five years later the *Bloomington Herald* commented that not more than three years had elapsed "since lumber was brought from the Alleghenies for the finish of our houses — now we see almost daily rafts of logs and excellent pine lumber floating down in search of a market''.²⁷

During the early years of rafting, log and lumber rafts were allowed to drift to their destination, which might be any town along the river between the source of the timber and St. Louis. Throughout the entire pioneer period, or until after the Civil War, rafts were floated without any motive power other than the river current. The speed of the raft was that of the current, about two and a half miles an hour. Whenever there was an upstream wind, however slight, it was necessary to tie up the raft until the wind changed, thus losing time because of this. A trip short in distance often turned out to be long in time.²⁸

The business of rafting followed a certain plan. Logs cut by lumberjacks were left at certain "booming works" where a rafter stopped for them. All logs were notched by a woodman's axe and each lumber company had a distinguishing mark, similar to the cattle brands, so there was no confusion over ownership. By means of various lines called

²⁶ Quoted in Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 22.

²⁷ Quoted in Richman's *Ioway to Iowa*, pp. 269-271.

²⁸ Walter A. Blair's *A Raft Pilot's Log*, pp. 27, 28.

guy-lines, A-lines, cross, fore, and aft lines, according to their location, large numbers of logs were fastened together. The raft was tightened further when necessary by means of a Spanish windlass and several varieties of sailor's hitches. Three sections of logs made a unit, called half a raft, 700 feet long and 135 feet wide. When the water was low, this was the total size. At other times a raft might be increased to 1,500 feet in length and 300 feet in width.²⁹

Many of the later forms of rafts had lumber, cross ties, sawn timbers, masts, piling, and posts piled on top of the logs. Some rafts had cabins or shacks to be used by the crew for sleeping and eating but generally they were moored at night to a tree or rock in a quiet bend of the river near some village where the men who operated the rafts were housed and fed.³⁰

When the crew lived on board, a low shed where the cook prepared meals for the crew of from twenty to thirty-five men was constructed in the center of this island of pine. The fare, limited in kind but ample in amount, was served without any thought of proper etiquette. Raftsmen knew what they wanted and got it, because the threat of being tossed overboard stimulated any cook to do his best. The crew slept in a shed at the stern of the raft, and the pilot had his cabin at the front where he had a free view of the river channel. Since any structure that would catch wind added to the work at the oars, raft workers were content with small shacks of rough boards.³¹

Sweeps were fastened at the front and rear of the raft. These were from 20 to 36 feet in length and were used as oars to steer the raft away from sandbars and other ob-

²⁹ Meyer's "Rafting on the Mississippi" in *The Palimpsest*, Vol. VIII, pp. 125, 126.

³⁰ Nelson C. Brown's *Logging Transportation*, p. 252.

³¹ Charles E. Russell's *A-Rafting on the Mississippi*, p. 100; Blair's *A Raft Pilot's Log*, p. 30.

structions.³² Planks were laid along the ends of the raft to provide footing for the men who worked the sweeps. Lengthwise down the center ran a plank for the pilot, who paced up and down, eyeing the channel, studying the wind, and warily watching the raft's movement. When the raft was to swing, he called, "Left behind, right in front," or "Right behind, and left in front", and the men leaned in unison against the long sweeps.

Raft pilots became famous men on the river. They were skillful, courageous, and uncanny in their memory of shifting bars and treacherous currents. One of the most famous of these was Stephen Hanks, cousin of Abraham Lincoln, who piloted great rafts for forty years when logs and lumber were the main item of commerce on the upper river. He knew every bend and sandbar, every towhead and cross-current from Stillwater to St. Louis.³³

Rafts of logs and lumber which these pilots brought down the river were sold in Iowa towns throughout the pioneer period, and came in increasing numbers after the railroads were constructed in the State. Large rafts of logs were landed at Burlington and other river cities where they were cut into lumber and remained in drying yards for a time; after this the lumber was shipped by railroad to various points in Iowa, Illinois, Missouri, Kansas, and Nebraska.³⁴

The price of logs and lumber varied greatly throughout the pioneer period. Pine lumber from the northern Wisconsin region, used in the early settlement of Illinois and southern Wisconsin in the third decade of the nineteenth century, sold for \$60 to \$70 per thousand feet. Hardwood material at the Clark mill in Scott County, Iowa, is said to

³² A. G. Ellis's "The 'Upper Wisconsin' Country" in *Collections of the State Historical Society of Wisconsin*, Vol. III, p. 441; Blair's *A Raft Pilot's Log*, p. 29.

³³ Walter Havighurst's *Upper Mississippi A Wilderness Saga*, pp. 190, 191.

³⁴ Willard Glazier's *Down the Great River*, p. 280.

have been available at \$35 a thousand feet in 1834, and that brought from Cincinnati at the same time was marketed for \$50 a thousand feet. By the middle 1840's the cost of timber products was much less than it had been previously. The price of "getting out" rails from forests in eastern Iowa was about sixty-two and a half cents a hundred. Those brought down the Mississippi and sold at the foot of the Upper Rapids were two dollars a hundred. The expense of erecting a cabin in the eastern part of the State in 1846 varied from \$50 to \$150. If a stable and sheds were added the total cost of all of the buildings was about \$500. By 1849-1850 the market price of lumber was \$10 to \$12 a thousand feet. Lumber at the Wisconsin mills in 1856 was \$12 a thousand or \$20 or more in Iowa. In a report of the lumbering business on the Upper Wisconsin submitted to the Wisconsin Senate by J. T. Kingston in January, 1857, the figures for various kinds of wood materials at the Dells were given as follows: lumber, \$15 a thousand feet; shingle and lath, \$2 a thousand feet; and timber and saw logs, \$10 a thousand feet.³⁵

The charges for rafting logs or lumber from the mills also varied in this period. Stephen Hanks received \$3 a thousand feet for rafting lumber in 1843, \$3.50 for logs, and 25 cents a thousand for carrying lath and shingles. The cost of "running out" lumber from the mills in Wisconsin to the lower market varied, according to season and distance, from \$5 to \$8 a thousand feet in the middle 1850's. This did not include wastage by breaking on the rapids which was estimated at about one-twentieth of the total cost.³⁶ The

³⁵ Ellis's "The 'Upper Wisconsin' Country" in *Collections of the State Historical Society of Wisconsin*, Vol. III, pp. 437, 443, 444; Swisher's *Iowa Land of Many Mills*, pp. 65, 66; Wm. J. A. Bradford's *Notes on the Northwest*, p. 147.

³⁶ Russell's *A-Rafting on the Mississippi*, p. 109; Ellis's "The 'Upper Wisconsin' Country" in *Collections of the State Historical Society of Wisconsin*, Vol. III, p. 440.

charges for rafting logs were in some instances higher than for handling lumber, but logs sold for less than lumber so they could be purchased profitably by Iowa mill owners.

When rafting made lumber more easily available the price went down. A writer in 1846 said that lumber could be obtained at less than half the price it had been seven years earlier.³⁷ As the settlement of the State moved inland from the Mississippi River it followed the streams; and mills propelled largely by water power followed the same pattern. These mills helped to supply some of the demand for lumber and in turn helped to reduce the price.

As the sawmills at such places as Dubuque, Clinton, Muscatine, Fort Madison, and other river cities increased both in size and number, so also did the number of logs rafted down the river. The census of 1840 gave the value of lumber produced in the Iowa Territory as \$50,280. By 1850 the sawmills of this area, furnished with logs from inside and outside the State, were cutting sufficient lumber to rank Iowa in eleventh place in the nation.³⁸

The woodworking industry in Iowa grew up around the sawmills in many of the river towns. Furniture-manufacturing establishments often grew up around the sawmills. The planing mills, which developed along with other woodworking shops, were of two kinds. The large majority of the establishments manufactured sash, doors, window and door frames, and interior wood for stock. A smaller number of shops did custom work.³⁹

Iowa City, located some distance west of the Mississippi River, had carriagemakers and furniture-making shops as well as special chair-making shops. In 1855, Burlington

³⁷ John B. Newhall's *A Glimpse of Iowa in 1846*, pp. 15, 16.

³⁸ Swisher's *Iowa Land of Many Mills*, p. 72; William Duane Wilson's *Description of Iowa and Its Resources*, p. 85.

³⁹ Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 41.

had a planing mill, four sash, door, and blind establishments, three steam sawmills, a shingle factory, a steam match factory, two furniture manufactories, and five wagon shops. At the same time, Muscatine had two sawmills, one stave factory, and three shingle machines all operated by steam, and Davenport had six sawmills, two planing mills, and two sash and blind factories, all operated by steam. Three years later Davenport had nine wagon shops, eight furniture factories, one employing 40 men, a wash tub factory, an establishment for building pianos, and 21 carpenter shops. LeClaire, a short distance to the north, had three wagon shops, two cooper establishments, two cabinet factories, and one boat yard where steamers were repaired and keelboats were constructed and rebuilt.⁴⁰

Not much is known about the amount and kinds of products that were manufactured in the first decade of settlement in Iowa, but by 1850 there were a number of woodworking establishments. The first indication on a State-wide basis of the kinds of woodworking industries, the number of establishments, and the volume of business was given in the Federal census of 1860.

Many of the early sawmills and woodworking establishments operated only a short time and were soon forgotten. Some that started in the pioneer period operated during the whole middle period of lumbering. A few of the woodworking establishments remain even today. Among those which continued in importance for many years are the D. Joyce and Company, the Clinton Lumber Company, the C. Lamb and Sons, and W. J. Young, all of Clinton, the Hershey Lumber Company and the Musser Lumber Company of Muscatine, Carson and Rand of Burlington, Knapp,

⁴⁰ Benj. F. Shambaugh's *The Old Stone Capitol Remembers*, pp. 291, 292; Nathan Howe Parker's *Iowa as It Is in 1855*, pp. 124, 161, 170; T. P. Christensen's "An Industrial History of Scott County, The Pioneer Period, 1833-1865" in *The Annals of Iowa* (Third Series), Vol. XXII, pp. 120, 121; Franc B. Wilkie's *Davenport Past and Present*, pp. 260, 261, 263.

Stout, and Company of Fort Madison and Dubuque, and S. and J. C. Atlee of Fort Madison.

Beginning with the primitive mills in the valley of the Mississippi in the 1830's, the sawmilling industry spread westward across to the Missouri, until in 1859 there were 540 sawmills operating within Iowa, with an average annual product value of \$4,000 each. Of the 183,000,000 board feet of lumber produced by all the mills of the State in 1859, only 22,000,000 feet came from local sources. The balance consisted of white pine logs rafted down the Mississippi River from northern forests. Long before 1860, the end of the pioneer period, log cabins and sod houses had given way to frame structures. The coming of railroads in the middle 1850's made it possible to bring in lumber from the river towns, and to build towns, red barns, and white farmhouses over 1,000 miles of prairie.⁴¹

By the latter part of this period most of the local timber had been cut. Before the railroads reached the valleys of the Red Cedar and Iowa rivers, much of the best red cedar and walnut along these streams had been rafted to the Mississippi for down-river trade. The westward expansion of railroads had much to do with the exhaustion of timber. Every accessible tree that would make a good bridge timber or sleeper was cut almost before the prairie sections of the State were permanently occupied. Portable saws had come into use throughout most of the State for cutting the few remaining patches of original forest and the second growth timber. To add to the supply of local timber quick-growing trees such as the locusts and cottonwoods were planted by farmers for shade and windbreaks and for fence posts.⁴²

⁴¹ Swisher's *Iowa Land of Many Mills*, p. 68; Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 35; Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, p. 64; Havighurst's *Upper Mississippi A Wilderness Saga*, p. 208.

⁴² Baker's *Native and Planted Timber of Iowa*, p. 9; John G. Wells's *Pocket Hand-book of Iowa* (1857), p. 31.

At the end of the pioneer period more and larger saw-mills were on the Mississippi River at points from which railroads started westward. To each of these cities such as McGregor, Dubuque, Clinton, Davenport, Muscatine, and Burlington, logs could be rafted cheaply from the pineries of the North. The river mills by 1860 could not supply nearly all of the lumber needed; much was still sent from Chicago, which received lumber from other parts of the forested lake States, but even this addition was not always enough.⁴³

By the end of the pioneer period steam power was rapidly replacing water power. Steam mills were free from dependence on stream-power sites and could be placed at advantageous positions on the river at points where there were rail connections.

LUMBERING AS BIG BUSINESS

By the end of the pioneer period all of the valuable original forests of eastern Iowa had been depleted. Some mills away from the immediate vicinity of the Mississippi River were cutting second-growth timber but the bulk of the raw material during this middle period came from rafted logs. This practice had been started fairly early in the pioneer period. By 1850, lumbering was being developed rapidly in Wisconsin along the Wisconsin, Black, Red Cedar, St. Croix, Wolf, and Chippewa rivers. From these, logs were floated down the Mississippi to Iowa towns where they were cut into lumber and other wood products.⁴⁴

The central States reached the peak of their hardwood lumber production about 1880. At this time a very thorough canvass of the eastern and central parts of Iowa was made

⁴³ Rufus Blanchard's *Hand-book of Iowa*, p. 23.

⁴⁴ Havighurst's *Upper Mississippi A Wilderness Saga*, p. 157; Swisher's *Iowa Land of Many Mills*, pp. 68, 69.

for hardwood by furniture manufacturers, and the valuable walnut not previously found was located and taken out. After this, most of the wood used for commercial purposes in Iowa came from the pineries of Wisconsin. By 1890, Wisconsin was second in the Union in lumber production. Ten years later, it was in first place. Michigan ranked second and Minnesota third. The lake States, as a section, however, contributed only 25 per cent of the national total in contrast to the 32 per cent produced by the southern States. These figures indicate that as a section the lake States were being "cut out" rapidly and that the southern States were to be the new high production center.⁴⁵ The conditions which hastened the exhaustion of the pine forests of the north were the demands of an increasing population in the States along the Mississippi and a greater per capita use of wood products.

To meet these increasing requirements, a larger and more regular flow of raw materials was essential. The old method of floating logs down the river by means of the current was no longer rapid enough; other and faster means were necessary. Several changes contributed to a more effective way of rafting.

One of these involved the use of a steamboat to move the raft. The first steamboats so used were sidewheelers which towed the raft with a cable. These were not very satisfactory, so W. J. Young, a pioneer lumberman of Clinton, Iowa, encouraged Capt. Cyrus A. Bradley to hitch a stern-wheeler to the stern of a raft to push and guide it in the stream. In the middle 1860's, Bradley made a successful trip from the mouth of the St. Croix to Fort Madison using the sternwheeler *Minnie Wills* as a towboat.

As soon as this proved successful in rafting, large saw-

⁴⁵ Stanley E. Horn's *This Fascinating Lumber Business*, pp. 30-35, 67; *American Forests and Forest Products* (U. S. Department of Agriculture, Statistical Bulletin, No. 21), pp. 56, 57.

mill firms and other boat owners used river steamers in every possible way. Ships of greater cost, power, and speed were introduced. By 1870, this method had practically supplanted the floating process. Sweeps were at first retained at the bow of the raft to aid in directing it in its course on the Mississippi, but later, a bowboat was used, which by moving backward and forward was able to guide the raft, leaving the stern boat free to use all of its power in pushing. This combination resulted in an average speed of three and a half miles per hour.⁴⁶

With the advent of the raft steamer, came the brailed raft, also planned by W. J. Young. Chains fastened around logs took the place of cross poles held down by pegs driven into the logs. This resulted in a tremendous saving of lumber as the ends of logs were no longer wasted because of peg holes. The brails were placed side by side much as the old type of raft had been arranged.

Another invention for guiding rafts was soon introduced. This "Clinton Nigger", a contribution of Chauncey Lamb, a leading lumberman of Clinton, proved so helpful that it was used from that time on by every boat in the rafting business. With this device the boat's position could be changed quickly and easily, forward or backward, in relation to the raft as the direction of the wind or the course of the stream required. This invention saved much time and money.⁴⁷

These various improvements of raft construction and operation made for larger, better, and more rafts on the

⁴⁶ John M. Holley's "Waterways and Lumber Interests of Western Wisconsin" in *Proceedings of the State Historical Society of Wisconsin*, 1906, p. 214; Irving B. Richman's *History of Muscatine County Iowa*, Vol. I, p. 81; Edward W. Durant's "Lumbering and Steamboating on the St. Croix River" in *Collections of the Minnesota Historical Society*, Vol. X, Part II, p. 665; Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, p. 76.

⁴⁷ Richman's *History of Muscatine County Iowa*, Vol. I, pp. 81, 82.

Mississippi from the Lake Pepin region of Minnesota to St. Louis. Along this busy thoroughfare were many towns important as lumber centers because they were accessible to raw materials and were near markets. Among these in Iowa were Dubuque, Clinton, Davenport, Muscatine, Burlington, Fort Madison, and Keokuk.

In order to keep a constant supply of logs available for the mills of river towns, logging companies were formed. In April, 1866, the Wisconsin legislature gave authority for the erection of booms, piers, wing dams, and other structures necessary for the work of booming⁴⁸ logs, providing that such works presented no obstruction to navigation. In accordance with these provisions, the Beef Slough⁴⁹ Manufacturing, Booming, Log-Driving, and Transportation Company was formed. This corporation constructed extensive improvements at a cost of nearly \$2,000,000 for a distance of five miles along the river. In 1889, these works were transferred across the river to West Newton, Minnesota. During that same decade, the Mississippi Logging Company was organized. It also used Beef Slough as a reservoir for logs.

These two companies for many years controlled almost the entire stock used by the mills on the Mississippi below this point. The total amount handled by the Beef Slough and West Newton works from 1867 to 1896 was over 8,000,000,000 feet of logs. The total for an average season amounted to about 300,000,000 feet. Over a hundred steam-

⁴⁸ "Booming" was the process of making large rafts by collecting loose logs and small rafts which had come down from tributary streams.

⁴⁹ The name of Beef Slough came from an incident which occurred in 1829. Jefferson Davis had been sent to the Red Cedar River, a tributary of the Chippewa, to cut logs needed for the repair of Fort Crawford. The log raft, on which were the oxen and outfit, was overturned at the junction of the Red Cedar and Chippewa and several of the oxen were drowned in the slough.—M. M. Quaife's "The Northwestern Career of Jefferson Davis" in *Transactions of the Illinois State Historical Society*, No. 30 (1923), p. 65.

boats and several thousand men were used during the period of peak production to carry timber from Wisconsin and Minnesota gathering centers to Mississippi River towns downstream from the centers. The usual toll charge for handling material at Beef Slough was seventy-five cents a thousand feet for logs and timber, two cents each for ties, and a penny each for fence posts.⁵⁰

Various arrangements were made for obtaining personnel for making the rafts and for piloting them. In the pioneer period, as well as in some cases later, pilots were hired by the day to guide the rafts. For this work, they received from five to fifteen dollars as a daily wage. Those with more available funds entered into a contract with a producer to take boards in pile at the mill. They then furnished all necessary men and outlay and delivered the lumber at Dubuque or other river towns at a stipulated price per thousand feet. The charge in the early 1870's for towing rafted logs from Beef Slough or West Newton to points in Iowa was \$1.10 per thousand feet.⁵¹

During the period when large scale rafting was common, many of the larger and more progressive lumber companies operated their own boats, but smaller mills depended upon regular steamboat companies and free lance captains. The Clinton rafting fleet in 1879 numbered eight sternwheel steamers and gave employment to about 175 men.

Neither lumbering in the north woods nor rafting on the Mississippi lasted long, because the supply of timber was

⁵⁰ Lucius P. Allen's *The History of Clinton County, Iowa* (1879), p. 526; Hotchkiss's *History of the Lumber and Forest Industry of the Northwest*, pp. 449, 635; Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, p. 72; E. W. Gould's *Fifty Years on the Mississippi*, p. 742; Franklin B. Hough's *Report upon Forestry*, 1877 [Vol. I], pp. 529, 530. Another source gives the amount of logs as from 400 to 600 million feet.—Russell's *A-Rafting on the Mississippi*, p. 238.

⁵¹ Ellis's "The 'Upper Wisconsin' Country" in *Collections of the State Historical Society of Wisconsin*, Vol. III, pp. 439, 440; Blair's *A Raft Pilot's Log*, pp. 290, 291.

used much more rapidly than new growth could take place.⁵² After five decades of large scale lumbering, the original softwood forests were largely "cut out" and by the close of the nineteenth century lumbermen and sawmill owners turned their attention to the softwoods of the southern States and the Pacific Northwest.

During the four decades following the coming of railroads to Iowa, bands of steel were flung westward across the nation; those reaching the wooded regions of the Northwest were of aid in bringing new supplies of lumber to Iowa. In 1894, the Northern Pacific Railroad established special east-bound rates on lumber and other forest products. These low rates were intended to stimulate lumbering and the movement of raw materials in large amounts from the Pacific Northwest to eastern markets. The railroad could afford to be generous for a time. It encouraged lumbermen to come to the northwest so that the timber on large forested areas owned by the railroad could be marketed. It also wanted to carry as freight the lumber products cut from land not owned by the company. In 1907, the railroad increased its rates 20 to 25 per cent, causing financial stress among sawmills of the northwestern States, but better rates were made later.⁵³

During this middle period a distinct pattern of mills and woodworking establishments developed. The many small mills in Mississippi River towns, which cut local timber or rafts of logs that were floated downstream at regular intervals, disappeared and large mills with many saws were concentrated in the larger river towns. The number of mills decreased as the size increased. In this middle period of

⁵² Logging on the Wisconsin River ended about 1876, on the Black River in 1897, on the Chippewa in 1905, and on the St. Croix about 1914.—Blair's *A Raft Pilot's Log*, p. 291.

⁵³ Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 42.

large producing units, wood-using firms in the river counties began to specialize in certain types of products which were marketed throughout the State as well as in other parts of the Middle West. Sawmills, largely portable in type and scattered throughout the State, cut lumber for fencing, for repair material, and for utilization in wood-using industries.

The importance of the river counties in lumber production is pointed out by the statistics for particular years at intervals throughout the period. The amount of lumber sawed in the ten river counties in 1870 was over 63 per cent of the total for the State. In 1880, these same counties produced 85 per cent of the whole amount and their contribution in 1885 was 97.49 per cent of the State's total, valued at \$8,485,531.

Definite lumbering centers were formed early in the middle period. During the 1875-1876 season, Clinton and the adjoining town, Lyons, contributed 40.5 per cent of the total lumber cut of Iowa. Davenport was second with 17.2 per cent, and Muscatine third with 11.1 per cent. In 1885, Clinton still ranked first with a total of \$4,046,643 for lumber, but Dubuque was second with \$1,310,000. Muscatine was still third with \$1,026,000. Four years later Iowa reached its peak in lumber production.⁵⁴

These large mills resulted from equipment changes. The early sash saws were replaced by circular and gang saws early in the middle period. These gang saws made possible the cutting of a log into boards in one operation. The use of band saws beginning about 1889, produced a better quality product and effected a marked saving in material because of a smaller kerf.⁵⁵

⁵⁴ Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 36; Hough's *Report upon Forestry*, 1877 [Vol. I], p. 544.

⁵⁵ R. C. Bryant's *Prices of Lumber* (War Industries Board Price Bulletin, No. 43), pp. 5, 6. The kerf was the slit produced by the saw.

The material cut in these river mills was largely of one kind. The bulk of the lumber, lath, and shingles manufactured in Iowa before 1900 was made of white pine; smaller amounts of chestnut, southern white cedar, and other woods were used.⁵⁶

The products of the woodworking industries during this middle period varied much more than did those of sawmills. There were firms making willow baskets, various kinds of wooden boxes, coffins, cooperage, furniture, planing-mill products, and ships and boats. Many other items were not listed separately or were produced in such small amounts that they did not appear in statistical tables. Most of the factories making these various products during this period were concentrated in the towns along the Mississippi because at these points the supply of raw material for most purposes was obtained cheaply by river rafting.⁵⁷

Making willow baskets was for many years a small business in a few centers in the State. Because of a local willow patch, Burlington was one of the State's chief contributors of these products. Many kinds of boxes were made in Iowa during the middle period. Early in the period, Iowa produced 2.5 per cent of the cigar boxes of the nation; later this decreased to 1 per cent. Coffin-making held a steady rank with respect to the nation's output throughout the middle period. This was about 2 per cent until 1904 after which it reached almost to the 3 per cent mark. Cloth-covered caskets were made principally from chestnut and pine, while about one-half of those made entirely of wood were of chestnut and cypress. Some thirty other woods were used in

⁵⁶ Nelson C. Brown's *Forest Products Their Manufacture and Use*, pp. 351, 352.

⁵⁷ Royal S. Kellogg's *Lumber and Its Uses*, pp. 192, 221, 223, 226; Brown's *Forest Products Their Manufacture and Use*, pp. 92, 248; Haworth's *The Economic Development of the Woodworking Industry in Iowa*, pp. 63-68; Hough's *Report upon Forestry*, 1877 [Vol. I], pp. 558-563; William J. Petersen's "Steamboats 'Dubuque'" in *The Palimpsest*, Vol. X, pp. 398-411.

small amounts for this purpose. Dubuque, Muscatine, and Burlington became manufacturing centers for these products during the middle period.

The manufacture of cooperage products during the first part of the middle period was also an important industry in Iowa, contributing as much as 8 per cent of the nation's total. Within a decade Iowa's percentage of this amount had gradually decreased to the 2 per cent mark near which it remained during the remainder of the period. Among the river towns, Burlington and Keokuk became production centers for these goods.

Furniture manufacturers found hardwoods more satisfactory for their purposes than white pine. The local supply of these was limited and as early as the 1870's some effort was made to insure future supplies by planting several kinds of trees which could be used for furniture construction as well as for other purposes. In the 1880's, furniture manufacturers culled Iowa's forested area for suitable woods. Among the more common woods used to make furniture were walnut, oak, maple, birch, red gum, yellow poplar, chestnut, beech, elm, and basswood. Since 1900, veneers have been utilized to a large extent in the furniture industry. By the end of the middle period, red gum was used for about one-third of all veneer work and smaller amounts of white oak and yellow pine also were employed. Furniture centers of the middle period included Dubuque, Clinton, Davenport, and Burlington. Iowa made almost 4 per cent of the nation's furniture in 1859, but since 1890 has contributed less than 1 per cent of that amount.

Planing mills were found in all river towns as well as in most other places having available lumber. During peak production, planing-mill products were the second most important item from the Iowa wood industries ranking below lumber, lath, and shingle manufacture. Sash and doors, a

few of the items included in this class, were made almost entirely from white pine procured by rafting.

Though never manufactured in large numbers or sizes, some boats have always been made in Iowa. During the middle period, these were made largely of pine but oak and other woods were used in their manufacture. Dubuque, in this period as well as later, was the chief center for ship-building.

A general view of lumbering during the middle period can be obtained by dividing the period into two parts of three decades each. From 1859 to 1889, the first of these parts, the lumber production of Iowa increased, but from 1889 to 1909 it decreased at about the same rate. During the second interval, the total production of the United States continued to increase and the percentage of Iowa production, compared to that of the national total, decreased successively from 2.25 per cent in 1889 to 0.30 per cent in 1909. In 1869, Iowa ranked ninth in the nation in lumber production, in 1879 tenth, in 1889 twelfth, and in 1899 it was no longer listed among the leading States.⁵⁸

When lumber was no longer available by river rafting and the railroads brought supplies from the southern and western States, the charges for carrying lumber the several hundred miles from the forest to the manufacturing centers and markets added costs to the material used in woodworking. Freight rates for lumber were from eight to ten dollars a thousand board feet and these costs were a burden upon the woodworking industries that remained in Iowa.⁵⁹

In this situation, firms using wood had two choices. They could move to the southern States or the Pacific Northwest

⁵⁸ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 86, 87; *American Forests and Forest Products* (U. S. Department of Agriculture, Statistical Bulletin, No. 21), p. 56.

⁵⁹ W. B. Greeley's "The Relation of Geography to Timber Supply" in the *Annual Report of the Smithsonian Institution*, 1925, p. 537.

and relocate there, or they could remain where they were and try, by effective management, to remain in competition. The ones that stayed had the advantage of being nearer their markets than those moving to the newer lumbering centers. The Gardiner Company and the D. Joyce Company of Lyons were two of the several firms which obtained lumbering interests elsewhere. The Musser Company and the Roach-Musser Company of Muscatine were two which chose to remain in Iowa.⁶⁰

When any region, though rich in timber, is "cut out" much more rapidly than new growth can take place, the end is total destruction. One steamboat captain prophesied as follows about lumbering and rafting a few years after peak production in Iowa: "The business has seen its best years. Forest fires and chopper's axe have destroyed nearly all of the good timber accessible. The average size of the logs diminishes each year; mill after mill will close when its supply of white pine is exhausted; one by one the two boats that have chased each other up and down the grand old river will be laid to rest and rot."⁶¹

The truth of these prophetic words was soon to be felt in Iowa. By the close of 1906, the year the last log raft came to an Iowa town, only a few sawmills were in operation along the Mississippi. The last of these was the Atlee mill at Fort Madison which closed in 1913. After this, sawmilling became again a local industry. The last raft of lumber on the Mississippi moved from Hudson, Wisconsin, to Fort Madison, Iowa, in 1915.⁶²

With the close of the rafting period, the people of Iowa

⁶⁰ Hotchkiss's *History of the Lumber and Forest Industry of the Northwest*, pp. 595, 599.

⁶¹ Walter A. Blair's "Rafting on the Upper Mississippi" in the *Davenport Democrat*, August 4, 1893.

⁶² Haworth's *The Economic Development of the Woodworking Industry in Iowa*, p. 33; Blair's *A Raft Pilot's Log*, p. 281.

again turned their attention to local timber and by 1909, nearly 500 small, mostly portable, sawmills were being operated in Iowa. Cottonwood and silver maple, previously deemed unsatisfactory for lumber, were used for interior construction and sold for from \$22 to \$28 a thousand board feet.⁶³

LUMBERING SINCE 1910

River rafting, so characteristic of the middle period, came to an end about 1910, although a few log rafts were brought down the Mississippi until 1913 when the last of the river sawmills closed. Rafts of sawed lumber, constructed in part from material that would have been rejected twenty years earlier, came down occasionally until 1915 when the last of these reached Fort Madison.

A word picture of the river scenes following the end of rafting is given in a quotation by a writer familiar with river towns at that time: "Thirty years ago [1886] the traveler bound east or west, in crossing the great Father of Waters at Clinton, would have seen piles of sawed timbers covering the entire river front, while banks of logs lay inside their booms for miles and miles along the shores. Today [1916] the picture is a mere memory. Here and there may be seen scattered piles of worm-eaten, weather-stained lumber — the only suggestion of a time when Clinton made millionaires, who exacted their tribute from the far-away pine forests of Minnesota and Wisconsin. In days now long since gone the river swarmed with huge rafts manned by turbulent river drivers whose magic touch controlled the course of acres upon acres of logs."⁶⁴

By the end of the middle period most of the softwood

⁶³ G. B. MacDonald's "Forestry and Forest Resources of Iowa" in *The Book of Iowa*, p. 165; Baker's *Native and Planted Timber of Iowa*, p. 9.

⁶⁴ Thomas Teakle's "The Romance of Iowa History" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XIV, p. 165.

which reached Iowa came from the Pacific Northwest, although the pine regions of the southern States were actually much closer to Iowa. The concessions made by the Northern Pacific Railroad as early as 1894 were, however, more than enough to compensate for the difference in mileage. A forty-cent per hundred freight rate was established for carrying lumber from the States of Oregon and Washington to St. Paul with similar rates for comparable distances. Such low rates did not last long; they were replaced by other arrangements somewhat favorable to the wood manufacturer. Late in the middle period, milling-in-transit was allowed without additional freight charges on lumber shipped to midwestern towns where it was manufactured and then sent to markets elsewhere. By 1917, due to some increases, the freight rates borne by the softwood marketed in the Middle West were from six to thirteen dollars a thousand board feet, depending upon the kind of wood and the distance carried, or from 20 per cent to 25 per cent of the retail price of the goods made from the lumber. In 1927, fees of $1\frac{1}{2}$ cents per hundred pounds were charged if lumber was manufactured at a point between the source and the market.⁶⁵

The increase in carrying charges throughout the period produced strong competition between Iowa manufacturers and those located near the timber source where the price of lumber was lower and through rates for finished goods to eastern markets were available. Notwithstanding these conditions, effective management and diversified production have made it possible to retain wood-using industries in eastern Iowa river towns and other centers farther west.

While softwoods have always been procured largely from

⁶⁵ Ovid M. Butler's *The Distribution of Softwood Lumber in the Middle West* (U. S. Department of Agriculture, Office of the Secretary, Report No. 115), pp. 42, 53; Haworth's *The Economic Development of the Woodworking Industry in Iowa*, pp. 42, 45; Bryant's *Prices of Lumber*, p. 12.

outside Iowa, many species of hardwoods grow in the State, but the supply of these has never been equal to the demands of manufacturers. Throughout the third period, some of this wood came from the broadleaf forests of other parts of the Midwest and from the southern States. During this same time, the amount of Iowa-grown timber used was but a small percentage of the total amount of hardwood consumed, partly because the total amount of timber in the State of sufficient size and quality for manufacturing purposes has been smaller than the amount needed yearly. The total area of land in forests in Iowa in 1935 was 2,312,244 acres of which 2,060,105 acres were pastured.⁶⁶

In a survey of wood-using industries conducted in 1926, it was found that Iowa wood manufacturers preferred to buy raw material from other than local producers, because Iowa woods had been found inferior for high grade products and they were, in some cases, poorly sawed, graded, and seasoned. Several wood users also reported that they did not wish to purchase less than carload lots of lumber and local producers seldom had that amount to sell.⁶⁷

During the middle period sawmilling was an important industry in Iowa, but by 1909 the Iowa percentage of the national total had decreased to 0.30 per cent. This decrease continued until by 1939 production of lumber in Iowa was only 0.002 per cent of the total for the United States; and Iowa's standing among the various States producing lumber was 44th in 1934 and 43rd in 1939. The status of sawmilling in Iowa compared with other industries in the State was equally insignificant. In 1919 sawmilling ranked ninth among the industries but thereafter due to decreased vol-

⁶⁶ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 90, 91.

⁶⁷ C. Lewis Harrison's "Markets for Iowa Grown Timber" (manuscript master's thesis, Iowa State College, 1926), pp. 72-74; MacDonald's "Forestry and Forest Resources of Iowa" in *The Book of Iowa*, p. 165,

ume of production, it declined until in both 1929 and 1939 lumbering was grouped with minor industries and lost its identity.⁶⁸

The rank of Iowa in lumber production during the third period has, however, been no indication of the number of mills in the State. Nearly 500 small sawmills were operating in Iowa in 1912, but a government publication reported only 5 sawmills in Iowa in 1928, and in a similar report listed 11 in 1930. A discrepancy between government figures and those compiled in unofficial surveys, such as that made by the Department of Forestry of Iowa State College in 1934 when 428 mills were listed, may be explained by the fact that the United States Census Bureau does not count a sawmill unless the yearly production of lumber is in excess of 50,000 board feet. There were 15 mills in Iowa cutting more than that amount in 1939, producing a total of 5,164,000 board feet of lumber, 30 in 1940, sawing 9,971,000 board feet, and 128 in 1941, cutting 32,544,000 board feet of lumber.⁶⁹

The author of one of the most recent publications on Iowa sawmilling wrote in 1942: "Practically no data are available relative to the present location of sawmills in Iowa, nor are data available which offer any information as to the number of mills in the various counties of the State. Foresters who are acquainted with Iowa report that there are, at present [1942], several small sawmills in almost every county."⁷⁰

One mill, owned by the Webster Lumber Company of St. Paul, was operating near Burlington in 1940. That year it

⁶⁸ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 86, 87.

⁶⁹ MacDonald's "Forestry and Forest Products of Iowa" in *The Book of Iowa*, p. 165; Horn's *This Fascinating Lumber Business*, p. 299.

⁷⁰ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 83, 84.

employed 10 men and produced 20,749 railroad ties and 107,873 board feet of lumber for the season. The daily capacity averaged 300 ties and 1,500 feet of lumber. Except for a small number of mills owned by this company, most of the sawmills during the past twenty-five years have been owned locally, some by farmers who operate them during the winter. In a few cases, the mills produce lumber throughout the year. The labor supply for the operation of these sawmills throughout the period has been available in the communities where the mills are located. Many of the workers so employed have been farmers working part time for their neighbors.

The sawmills operating in Iowa now are largely portable or semi-portable in type and can be moved readily from one place to another. Most of them consist of a circular saw with a log carriage. A few have edgers to remove the outer parts of the boards and rip them into desired widths. Before 1925, these sawmills were propelled by steam tractors but have since then been operated by internal combustion engines, some by old automobile engines which furnish the power for operating the saw and moving the saw rig. Such saws have a limited capacity of from 1,000 feet to a maximum of 10,000 feet of lumber a day. The wood reaches the market as mine props, railroad ties, posts, and lumber of various dimensions.⁷¹

Many kinds of wood are sawed in Iowa mills, but a few species have always been used in larger amounts than the others. In 1913 oak, walnut, cottonwood, and elm were the most used woods. The amount of walnut cut varied greatly from year to year. In 1913 the production was 290,000 board feet, and in 1914, nearly 5,000,000 board feet. Some of this increase was caused by wartime use for gunstocks. Ten years later, when this wood was much desired for furni-

⁷¹ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 84-86.

ture construction, well over 7,000,000 feet was produced. Since 1930, however, there has been a marked decrease in the cut of walnut. Of the 49 kinds of wood used in industries of Iowa in 1947, 17 were grown in the State — ash, basswood, birch, black walnut, butternut, cherry, cottonwood, elm, gum, hemlock, hickory, maple, three varieties of oak, Jack pine, and red cedar. Sycamore and hackberry, listed as Iowa woods in 1924, were not cut for commercial use in 1947.⁷²

While sawmilling decreased greatly in Iowa during the third period, woodworking industries in general maintained more steady production levels. Most products were made in quantities comparable to that of the last part of the middle period, and a few types of goods were produced in increasingly larger amounts. The manufacture of washing machines, for example, increased tremendously from 1914, when Iowa produced 23.1 per cent of the nation's total, to 1927, when the amount had risen to 49.5 per cent of that total. During the third period, however, manufacturers changed from wood to metal machines so that the increased production of this appliance did not imply a corresponding increase in the amount of wood used. During the first decade and a half of the third period, lumber and its remanufactures varied from third to sixth place among the industries of Iowa.⁷³

The most striking change in the production of Iowa wood products occurred in the output of certain planing mills which previously had not been reported as large manufacturers. In 1933 such establishments in Iowa contributed 20 per cent of the nation's sash output, 5 per cent of the door

⁷² Harrison's "Markets for Iowa Grown Timber" (manuscript thesis), p. 5.

⁷³ Ruth L. Hoadley's *Industrial Growth in Iowa* (*Iowa Studies in Business*, No. 2, State University of Iowa), pp. 16, 69; H. H. McCarty's *Manufacturing Trends in Iowa* (*Iowa Studies in Business*, No. 8, State University of Iowa), p. 57.

frames, and 33 per cent of the doors made in this country.⁷⁴

Although there were some decreases in the amount of goods produced and some change in rank with respect to such industries throughout the nation, Iowa woodworking firms have been able to compete successfully against companies nearer the source of raw materials and many firms have remained in operation for several years. Another proof that some companies have prospered is indicated by the opening of new branch firms elsewhere. This has been especially true of the larger companies started during the rafting period which are located in cities along the Mississippi.

Following the period of concentration of lumbering and its associated industries along the Mississippi, a variation in the distribution pattern took place. In the third period, when lumber came to the State by rail, the river towns continued as production centers for woodworking products. When lumber became available at all places having rail connections with the source regions, cities in the State away from the Mississippi River started to manufacture the goods for which there was a local demand. Indeed, some of the wood manufacturing shops in the smaller towns had existed in pioneer and middle periods. These continued to operate during the third period and others were started. In total numbers there were more factories in the smaller towns than in larger centers during the third period but these contributed less of the total amount of goods produced in proportion to their numbers. The present pattern of wood-using industries includes several large companies in each of the more densely populated centers and a single firm in several of the smaller towns.

The products made by wood-using industries in the third

⁷⁴ *The Book of Iowa*, pp. 49, 50; Haworth's *The Economic Development of the Woodworking Industry in Iowa*, pp. 57-59.

period have been, with the exception of car parts, much the same as those produced in the last half of the middle period. Throughout the third period the groupings of products changed somewhat so that certain types of goods lost their identity in census figures. Sash, doors, and blinds, for example, were, after 1880, classified under the general heading of planing-mill products.

The survey made in February, 1947, for this dissertation included replies from 170 wood-using firms making 77 individual items, including millwork for construction purposes, farm machinery, barrels, baskets, boxes and crates, cabinets, caskets, cedar chests, fences, and various fixtures for home, store, and office use. The softwoods which came to the State during the third period were largely Ponderosa pine, Douglas fir, Sitka spruce, and other woods from the Pacific Northwest. A much smaller proportion of softwood and some hardwood came to Iowa from midwestern and southern States.⁷⁵

While sawmills in Iowa cut several kinds of Iowa-grown hardwood during the third period, the amount of these used by manufacturers of wood products was a small percentage of the total. Of the 586,799,000 board feet of lumber consumed in the State in 1926, only 14,002,000 came from Iowa mills. Wood-using industries at that time needed 191,000,000 board feet a year. Only one-half of one per cent of the total lumber consumed in 1936 came from the forests within Iowa.⁷⁶ During the recent war, wood-using firms had difficulty in obtaining raw material from the usual sources. They were forced to use whatever they could get which

⁷⁵ MacDonald's "Wood-Using Industries of Iowa" in *Ames Forester*, Vol. XI, pp. 103-111; Harrison's "Markets for Iowa Grown Timber" (manuscript thesis), pp. 26, 28, 30-35, 38-42, 44-48, 51-53, 61-71; McCarty's *Manufacturing Trends in Iowa*, pp. 60-63; *The Book of Iowa*, pp. 49, 50, 60.

⁷⁶ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, p. 89; R. V. Reynolds and A. H. Pierson's *Lumber Distribution for 1936*, p. 45.

would serve the purpose. This difficulty was mentioned repeatedly in replies received in the 1947 survey of wood-using industries. At that time, lumber was being received from thirty-five States in this country as well as from various parts of Canada, Mexico, Central and South America, Africa, and the Philippine Islands.

No statistics as to the amount of value of products sold in various areas during the third period were compiled in the 1947 survey of wood-using industries, but a significant number of responses indicated that local markets still absorb a large percentage of the wood products available, although the markets included areas beyond the State. Several firms stated that their merchandise was sold throughout the State as well as in other midwestern States. About 20 per cent of the companies answering the inquiry suggested that the market for their goods was nationwide. A few firms at present sell products outside continental United States. A complete report of all activities of wood-using industries in Iowa in 1947 cannot be given because no data has been received from some companies in operation at present.

Present day manufacturers of wood products in Iowa have several problems. Since Iowa is a prairie State and its small forests have been cut over several times, much of the wood used in manufacture must come from the commercial forests of the Pacific Northwest and the southern States. Iowa manufacturers have found that careful management is necessary to compete successfully on a national scale against wood-using companies located closer to the source of raw materials. The nearness of Iowa factories to their markets and the supply of skilled labor in Iowa manufacturing centers have helped in part to compensate for the high freight costs for carrying lumber great distances. Friendly trade relationships established over a period of time between manufacturing companies and retail dealers

composing their markets have also helped to counteract competition from out-of-State manufacturers.

Although Iowa must always receive much of its lumber from outside, more local wood than is used at present may be available in the future. The Iowa State Planning Board, the United States Soil Conservation Service, and the State Conservation Commission are working toward setting aside certain areas as forest lands, and are attempting to guard against forest fires and poor cutting practices.⁷⁷

Barring unfavorable changes, the wood-using industries of Iowa should continue to operate for some time much as they have done in the past three decades during which much of the lumber used has come from great distances by rail.⁷⁸ So long as wood processing continues to be based on skilled labor and hand-manufacture with a minimum use of machinery, it will undoubtedly continue to operate successfully in decentralized units which supply local markets, as well as those extending over greater areas. If, however, circumstances based either on historic conditions or production factors, change the present production methods to the assembly line specialization now used in automobile and airplane manufacture, wood-using industries in Iowa will either develop greatly or die out entirely.

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⁷⁷ Hartman's "The Iowa Sawmill Industry" in *THE IOWA JOURNAL OF HISTORY AND POLITICS*, Vol. XL, pp. 92, 93.

⁷⁸ *The Book of Iowa*, p. 50; *Iowa A Guide to the Hawkeye State*, p. 96.

